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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,984	01/29/2004	Atsushi Kazama	500.43431X00	2796
20457	7590	04/21/2006	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				PETKOVSEK, DANIEL J
ART UNIT		PAPER NUMBER		
				2874

DATE MAILED: 04/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/765,984 <i>Dep 4/14/06</i> Daniel J. Petkovsek	KAZAMA ET AL. Art Unit 2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on amendment filed February 1, 2006.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-12 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-12 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on January 29, 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 12/5/05.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

This office action is in response to the amendment filed February 1, 2006. In accordance with the amendment, claims 1, 4, 6, 11, and 12 have been amended. Claims 1-12 are pending.

***Information Disclosure Statement***

1. The prior art documents submitted by Applicant in the Information Disclosure Statements filed on December 6, 2005, have been considered and made of record (note attached copy of forms PTO-1449).

***Claim Objections***

2. Claim 6 is objected to because of the following informalities: in the 5<sup>th</sup> section “passes through said first mirror and said *second* mirror array”, should read, “passes through said first mirror and said mirror array”. There is only one mirror array. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 8-10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Yong U.S.P. No. 6,490,384 B2.

Yong U.S.P. No. 6,490,384 B2 teaches (Fig. 3; column 5 line 42 through column 6, line 17) an optical switch 200 comprising: a collimator array including a plurality of input and output collimator 216 at a same position coupled to optical fibers 214, a mirror array 222 with a plurality of movable mirrors 224 in a common horizontal plane; a first mirror 226; a second mirror 232; wherein the light leaving said second mirror 232 passes the said first mirror 226 and said mirror array 222 and optically couples to said collimator array, and wherein the movable mirror array 222 can cause switching combinations between the inputs and outputs, which clearly, fully meets Applicant's claimed limitations.

Regarding claim 2, all of the mirrors are illuminated by the optical signal, and the receiving output collimator/fiber receives the signal.

Regarding claim 3, the mirrors are "fixed" in a generally fixed location so they won't be displaced (see Fig. 3).

Regarding claims 8 and 10, bases substrates are inherently included to maintain positioning and apply voltage to position the mirrors properly.

Regarding claim 9, there is one array and a plurality of collimators, which meets the claim language.

Regarding claim 12, a common electrode exists for driving a mirror of said mirror array.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yong U.S.P. No. 6,490,384 B2.

Yong U.S.P. No. 6,490,384 B2 teaches (Fig. 3; column 5 line 42 through column 6, line 17) an optical switch 200 comprising: a collimator array including a plurality of input and output collimator 216 at a same position coupled to optical fibers 214, a mirror array 222 with a plurality of movable mirrors 224 in a common horizontal plane; a first mirror 226; a second mirror 232; wherein the light leaving said second mirror 232 passes the said first mirror 226 and said mirror array 222 and optically couples to said collimator array, and wherein the movable mirror array 222 can cause switching combinations between the inputs and outputs. Yong '384 does not *explicitly* teach an optical switch in which the optical path between the first mirror and the second mirror is formed longer than the optical path between the movable mirrors of the mirror array and the first mirror.

Regarding claim 7, although not explicitly taught (reference is silent) in Figure 3 of Yong '384, a person having ordinary skill in the art would have recognized at the time the invention was made that the optical paths lengths could be altered and arranged in order for the optical path length to be either shorter, the same, or longer. A person having ordinary skill would have recognized that these changes would effect proper coupling functionality based on the type of optical signals that were to be propagated through the system.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. US 2005/0213877 A1, and further in view of Giles et al. US 2003/0002782 A1.

Wu et al. US 2005/0213877 A1 teaches (Figs. 3 and 6, [0023]-[0028]) an optical switch 100 comprising: a collimator array including a plurality of input and output collimators at the same position to collimate the input/output light [0010]; a wavelength dispersive element 16; a first mirror 102; a second mirror 106; wherein light leaving the second mirror passes through the first mirror and the dispersive element and is coupled back into the collimator array(s). Wu et al. '877 does not explicitly teach that a mirror array is used having a plurality of movable mirrors, but instead teaches a dispersive element 16.

A person having ordinary skill in the art at the time the invention was made would have recognized the interchangeability of an optical dispersive element with a movable mirror array. The equivalence in the art of these components to perform the same function (optically switching light signals), and the selection of either of these well known components would have been within the level of one of ordinary skill in the art. Both components are well known to one having ordinary skill to complete the optical switching functionality in the state of the art.

Wu et al. '877 does not explicitly teach "said second mirror is disposed *closer to said optical fiber side* compared to a connecting position... in a longitudinal direction."

Giles et al. US 2003/0002782 A1 teaches optical MEMS reflective devices in which a number of the embodiments show a region between mirrors extending in a direction on the input/fiber side of the collimators more than on the collimator side of the optical signal.

Since Wu et al. '877 and Giles '782 are both from the same field of endeavor, the purpose disclosed by Giles '782 would have been recognized in the pertinent art of Wu et al. '877.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ optical MEMS switching devices having multiple mirrors/reflectors in the embodiment (including having an optical path being disposed more on the optical fiber side of the collimators) as disclosed by Giles '782 for the purpose of improving the number of directions that the optical signals can be sent. These embodiments would have been obvious to a person having ordinary skill in the art in order to, for example, couple optical signals behind the input source in order to allow optical switch elements to send these optical transmission in front or behind them (for the purpose of decreasing the overall number of optical elements in the system (i.e. make the device smaller)).

Regarding claim 5, the dispersive element and the first mirror are more on the side of the collimators than the other side thereof.

8. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. US 2005/0213877 A1.

Wu et al. US 2005/0213877 A1 teaches (Figs. 3 and 6, [0023]-[0028]) an optical switch 100 comprising: a collimator array including a plurality of input and output collimators at the same position to collimate the input/output light [0010]; a wavelength dispersive element 16; a first mirror 102; a second mirror 106; wherein light leaving the second mirror passes through the first mirror and the dispersive element and is coupled

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back into the collimator array(s), in which the optical path overlaps the collimator array (side to side). Wu et al. '877 does not explicitly teach that a mirror array is used having a plurality of movable mirrors, but instead teaches a dispersive element 16.

A person having ordinary skill in the art at the time the invention was made would have recognized the interchangeability of an optical dispersive element with a movable mirror array. The equivalence in the art of these components to perform the same function (optically switching light signals), and the selection of either of these well known components would have been within the level of one of ordinary skill in the art. Both components are well known to one having ordinary skill to complete the optical switching functionality in the state of the art.

Regarding claim 11, Wu et al. '877 teaches (Figs. 3 and 6, [0023]-[0028]) an optical switch 100 comprising: a collimator array including a plurality of input and output collimator at a same position coupled to optical fibers, a dispersive element 16 having reflectors in a common horizontal plane; a first mirror 102; a second mirror 106; wherein the light leaving said second mirror 106 passes through the said first mirror 102 and said dispersive element 16 and optically couples to said collimator array, and wherein the dispersive element can cause switching combinations between the inputs and outputs. Wu et al. '877 does not *explicitly* teach that a mirror array is used having a plurality of movable mirrors, but instead teaches a dispersive element 16.

A person having ordinary skill in the art at the time the invention was made would have recognized the interchangeability of an optical dispersive element with a movable mirror array. The equivalence in the art of these components to perform the same

function (optically switching light signals), and the selection of either of these well known components would have been within the level of one of ordinary skill in the art. Both components are well known to one having ordinary skill to complete the optical switching functionality in the state of the art.

The connection of a mirror array of movable mirror to a control IC would have been an obvious to a person having ordinary skill, since it is well known to use control systems to control the functionality of tilttable mirrors (if the dispersive element were replaced by a mirror array as disclosed in the above rejection). Official notice has been taken for using a control IC to control an array of mirrors.

***Response to Arguments***

9. Applicant's arguments filed February 1, 2006 have been fully considered but they are not persuasive. Applicant traverses the rejections to Yong U.S.P. No. 6,490,384 B2 to claims 1-3 and 7-10 by stating that light from Yong '384 does not pass through the first mirror and mirror array. However, in independent claims 1, 2, and 12, Applicant does not claim that the light passes *through*, only passes. Light "passing" can be read to mean passing over or around, and not necessarily through. It is noted that the new rejection to claim 12 is necessitated by the new amendment that placed the claim in condition for examination.

10. Regarding independent claims 4, 6, and 11, "passing *through*" is claimed. Accordingly, Yong '384 is not applicable to claims 4-6 and 11 in either 35 U.S.C. 102 or 103 rejections, and the previous rejections have been withdrawn.

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11. Applicant's arguments filed February 1, 2006, with respect the rejections to claims 1-3 and 6-9 to Jin et al. '475 have been fully considered and are persuasive. The rejections of claims 1-3 and 6-9 to Jin '475 have been withdrawn.
12. New rejections have been made to claims 4-6 and 11 to Wu et al. US '877 and further in view of Giles '782 (as to claims 4 and 5 only). These rejections were necessitated by the amendments presented on February 1, 2006.

*Conclusion*

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Petkovsek whose telephone number is (571) 272-2355. The examiner can normally be reached on M-F 8:30-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Petkovsek

April 14, 2006



AKM ENAYET ULLAH  
PRIMARY EXAMINER